93 upon an amount of said effluent gas produced reaching a predetermined value.--.

REMARKS

The application has been reviewed in light of the outstanding Action. Claims 1-47 are currently pending, with claims 1, 25-27, 36, 37, 40, 41 and 45 being independent. Claims 47 and 48 have been added and claims 25, 26 and 43 have been amended. Claims 25 and 26 have been amended to remove the recited language "when an amount of said effluent gas produced reaches a predetermined value"[1], which has been incorporated into dependent claims 47 and 48, (dependent from claims 25 and 26, respectively). Thus, new claims 47 and 48 are fully supported in the present application.

Applicants wish to thank the Examiner for the allowance of claims 27-36, 40, 45, and 46. With regard to objected to claims, the Action does not indicate the specific objection to claims 2-15, 17-21, 23, 38, 39 and 42-44, which was noted on the first page of the Action. Applicants recognize that this may be an indication that the claims may be allowable if rewritten in independent form. If so, Applicants again thank the Examiner if that is the case.

However, Applicants do not wish to proceed in such a manner. Rather, Applicants wish to respectfully point out (below) reasons for the patentability of the base independent claims to which each of the objected claims depend.

Rejection of Claims 26 and 43 Under 35 U.S.C. §112, second paragraph

Claims 26 and 43 were rejected for the reasons set out on page 2 of the Office Action. That is, the Action rejected claim 26 under §112, second paragraph, as being directed to both an apparatus and a method, and rejected claim 43 under the same statute for insufficient antecedent support for the term "collar".

With regard to claim 43, Applicants have deleted the phrase "adjacent said collar" from the claim. Thus, the issue regarding antecedent support is now considered moot. With regard

[1] Claim 26 includes the same amendment, save for the term "produced".

to claim 26, Applicants have amended the claim to better reflect that the claim is directed solely to a method.

Accordingly, in view of Applicants remarks set out above, Applicant respectfully requests that the §112, second paragraph rejection be withdrawn.

Prior Art Rejection of Claims 1, 16, 22, 24-26, 37 and 41

Claims 1, 16, 22, 24-26 and 37 were rejected to under 35 U.S.C. §102 as being anticipated by U.S. patent no. 6,242,120 (Herron). Claim 41 was rejected under §102 as being anticipated by U.S. patent no. 6,468,681 (Horiguchi). For the following reasons, Applicants submit that the claimed invention is patentable over the prior art.

The Invention:

As recited in claim 1, the present invention is directed to a fuel cell system including an anode chamber having a fuel, a cathode chamber in fluid communication with an oxidizing agent, a proton conducting membrane electrolyte separating said chambers and a first valve for controlling a first flow of a gas from the anode chamber into the cathode chamber. Independent claims 26 and 37 recite the same patentable features.

Claim 25 is directed to a corresponding method for reducing the amount of water in a cathode chamber of a fuel cell system including collecting an effluent gas produced by an anode chamber of the fuel cell and exhausting the collected gas through the cathode chamber. The effluent gas helps to eliminate water buildup within the cathode chamber.

Claim 41 is directed to a fuel cell system including an anode chamber having a fuel, a cathode chamber in fluid communication with an oxidizer, the cathode chamber having an inlet positioned a first end of the cathode chamber and an outlet positioned adjacent a second end of the cathode chamber, a proton conducting membrane electrolyte separating the chambers and having an effluent gas-permeable portion allowing effluent gas produced in the anode chamber

to flow into the cathode chamber and a nozzle having an inlet positioned immediately adjacent the gas-permeable portion in cathode chamber and an outlet positioned adjacent outlet of the cathode chamber.

The Cited Prior Art

As understood by Applicants, Herron is directed to a system for optimizing the purge cycle of a fuel cell stack which is responsive to the performance of the fuel cell. The system includes a controller that measures a process parameter which indicates the rate at which water is produced in the fuel cell. Upon the measured value exceeds a threshold value, a purge assembly (valve) is automatically initiated. As Figure 1 illustrates, Anode chamber 16 and cathode chamber 18 include purge valves 32 with sensors attached thereto. The sensors are electrically connected to a controller 40 via communication line 48, as is a sensor 42 via communication line 44. Thus, when the controller receives a sensor signal indicating that the fuel cell stack should be purged, the corresponding purge valves are actuated.

As also understood by Applicants, Horiguchi is directed to a fuel cell system having a plurality of fuel cells. Each fuel cell includes a cathode and an anode disposed on opposite sides of an electrolyte membrane, and an air supply passage through which atmospheric air is supplied to the cathode. A fuel gas supply passage supplies hydrogen gas from a hydrogen storing alloy to the anode and water spray nozzles spray liquid water directly onto the cathode. The hydrogen storing alloy is heated by heat exchange with the exhaust air at an elevated temperature discharged from the cathode, to facilitate its endothermic reaction in which it produces hydrogen gas to be supplied to the anode. The sprayed water is fed to the hydrogen storing alloy to cool the same to thereby enhance an exothermic reaction in which hydrogen gas is stored in the hydrogen storing alloy.

Analysis

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." M.P.E.P. 2131, quoting, Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

Applicants could find nothing in Herron which discloses (or would have taught or suggested to one or ordinary skill in the art at the time the invention was made for that matter) either a first valve for controlling a first flow of a gas from the anode chamber into the cathode chamber, or exhausting a collected gas (effluent) through the cathode chamber.

It appears that the Action mistook items 40 and 41 to refer to a conduit of some source. This is not the case. Figure 1 of Herron does not illustrate, nor does the specification disclose, any valve or conduit (or any device for that matter) for allowing or controlling a first flow of a gas from the anode chamber into the cathode chamber. To that end, since there are no means of allowing any flow of any gas or liquid between the chambers of the fuel cell (save for the electrolytic membrane), then the system of Herron cannot possibly disclose, teach or suggest that an effluent gas produced and collected by an anode chamber of a fuel cell being exhausted through the cathode chamber. For at least those reasons, claims 1, 25, 26 and 37 are patentable over the prior art.

Applicants could also find nothing in Horiguchi which discloses (or teaches or suggests) a nozzle having an inlet positioned adjacent the gas-permeable portion in cathode chamber and an outlet positioned adjacent outlet of the cathode chamber. The gas-permeable portion of the proton conducting membrane allows effluent gas produced in the anode chamber to be directed into the cathode chamber. As the gas enters the cathode chamber, it is received by the inlet of the nozzle, positioned immediately adjacent the gas permeable portion. Upon the gas existing the nozzle, it is accelerated and exits out an outlet of the cathode chamber. As the accelerated gas leaves the cathode chamber, it creates a negative pressure which causes air to enter the cathode chamber through air inlet, and exit adjacent the end of the nozzle with the effluent gas

(see Fig. 5). The air from the air inlet removes water from the reactive sites of the cathode chamber.

In contrast, in Horiguchi, the nozzles are used to spray liquid water onto the cathode to cool it down. The nozzle inlets are not positioned adjacent the gas-permeable portion of the proton conducting membrane as in the present invention. The nozzle inlets of Horiguchi obviously face a conduit from a water source. Accordingly, claim 41 is believed patentable over the prior art. Accordingly, in Horiguchi, water is applied to the cathode rather than being removed therefrom as in the present invention.

Since claims 16, 22 and 24, the remaining rejected claims all ultimately depend from claim 1 (distinguished above), these claims are patentable for the same reasons. Accordingly, Applicants respectfully request that the §102 rejection be withdrawn.

CONCLUSION

In view of the foregoing remarks, Applicant submit that the issues raised in the outstanding Office Action have all been addressed. Accordingly, Applicants respectfully requests favorable reconsideration and early passage to issue of the present application.

It is believed that no fees are due in connection with filing this Amendment. In the event that it is determined that fees are due, however, the Commissioner is hereby authorized to charge the undersigned's Deposit Account No. 50-0311.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 935-3000. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

Dated: February 25, 2003

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ATTACHMENT

25. A method of reducing the amount of water in a cathode chamber of a fuel cell system comprising:

collecting an effluent gas produced by an anode chamber of said fuel cell; and

exhausting said collected gas through said cathode chamber to reduce water buildup within said cathode chamber [when an amount of said effluent gas produced reaches a predetermined value].

26. In a fuel cell system comprising:

an anode chamber having a fuel,

a cathode chamber in fluid communication with an oxidizing agent,

a proton conducting membrane electrolyte separating said chambers, and

a valve for controlling a flow of a gas from said anode chamber into said cathode chamber, [and]

a method for reducing the amount of water in said cathode chamber comprising:

closing said valve;

collecting an effluent gas produced by fuel oxidation in said anode chamber; and

opening said valve to exhaust the effluent gas out of the fuel cell from the anode chamber through the cathode chamber to reduce water buildup within

said cathode chamber [when an amount of said effluent gas reaches a predetermined value].

43. The fuel cell system according to claim 41, further comprising a mixing chamber positioned adjacent [said collar and] said outlet of said cathode chamber.

--47. The method according to claim 25, wherein the collected effluent gas is exhausted through said cathode chamber when an amount of said effluent gas produced reaches a predetermined value.--

--48. The method according to claim 26, where the valve is opened to exhaust the effluent gas upon an amount of said effluent gas produced reaching a predetermined value.--.